

## COVID-19 presenting as myocardial infarction in a young female: A rare case report

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**ABSTRACT**

COVID-19 has increased incidence of thrombotic incidents due to its pro thrombotic state. Ever since the initiation of this pandemic in 2020, there has been an increased mortality due to complications arising due to COVID-19 infection. One of the leading causes of mortality in COVID-19 patients besides the respiratory distress has been myocardial infarction. In the discussion of Acute Myocardial Infarction, posterior wall myocardial infarction has always been difficult to diagnose. It is a challenging to diagnose as well as manage Posterior Wall myocardial infarction which is often missed on routine electrocardiogram in the emergency department. We report a case of a young female aged 32 year old who presented with COVID-19 induced Posterior Wall myocardial infarction. Though the cases of myocardial infarction in people with prior comorbidities and in older age group are common this a rare case report show casing a young female who developed myocardial infarction which later turned out to be posterior wall myocardial infarction induced by COVID-19.

**Keywords:** COVID-19, myocardial infarction, Posterior wall MI

**1. INTRODUCTION**

COVID-19 has caused havoc ever since it's widespread devastation in the year 2019-20. Though the thromboembolic events of COVID-19 are well reported and anticipated it is unusual to foresee such devastating complications in the Young population (Morris & Brady, 2002). Occlusion of blood flow to the cardiac tissue results in myocardial infarction which presents as acute onset chest pain; however there has been a new upsurge in the cases of myocardial infarction being related to COVID-19. Type 1 myocardial infarctions caused due to coronary artery disease are more common to occur in COVID-19 than type 2 which are caused due to imbalance between oxygen demand and supply (Ueki et al., 2020).

Electrocardiogram is simple but effective method to diagnose myocardial infarction along with location of myocardial wall involved. Though anterior,



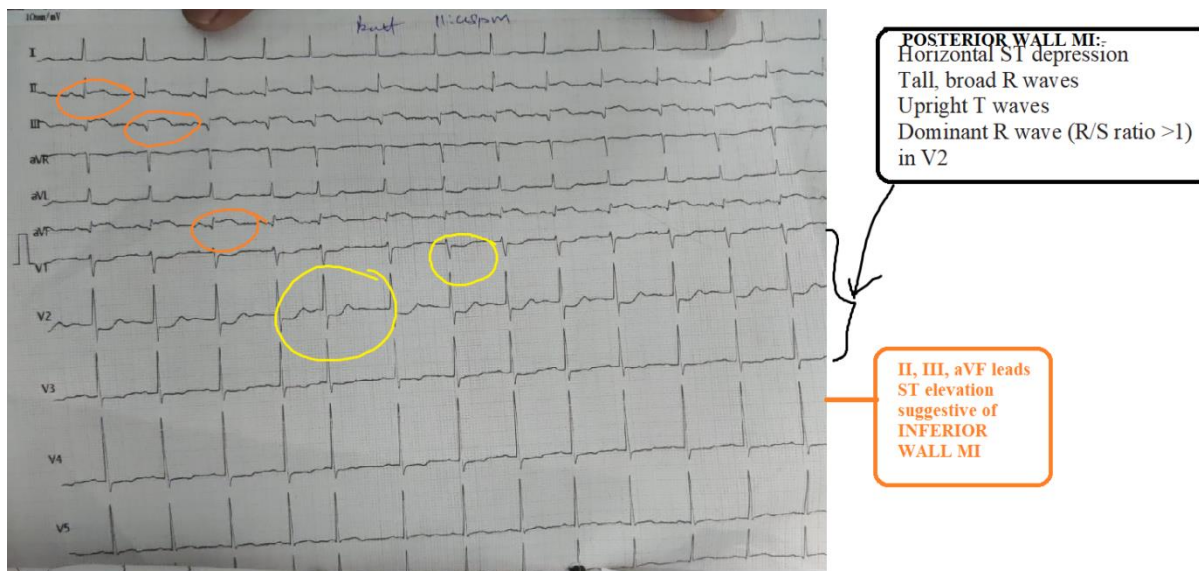
inferior and lateral myocardial infarctions are routinely encountered and easy to diagnose, posterior wall myocardial infarction is somewhat tricky to diagnose (Morris et al., 2002). For the diagnosis of acute myocardial infarction, ST elevation in the leads representing the cardiac wall along with raised cardiac markers is pivotal. The standard 12 lead ECG depending on the changes in the lead enable us to identify the wall affected, but as the leads are placed on the precordium and the limbs, it is difficult to interpret the posterior wall changes as a result it goes undiagnosed many times. Hence it is essential to develop clinical acumen to be able to analyse the ECG and suspect posterior wall changes, these changes can further be confirmed by taking a posterior lead ECG. COVID-19 is a pro thrombotic state with increased chances of thrombosis in the arteries leading to dangerous complications such as acute myocardial infarction and acute cerebrovascular accidents. In this case report we highlight a case of posterior wall myocardial infarction who presented with chief complaint but turned out to be COVID-19 positive on further investigations. We highlight the challenges faced in diagnosing posterior wall myocardial infarction and managing a posterior wall myocardial infarction with COVID-19 as the aetiology.

## 2. CASE REPORT

A 32-year-old female came with complaints of retrosternal chest pain since 5 hours radiating to left arm and back associated with sweating and palpitation. There was no history of breathlessness, cough, orthopnoea, PND. There was no history of hypertension, diabetes mellitus or other chronic medical illness. On admission, patients vitals were checked and pulse was 112/min with Blood pressure of 70mmHg systolic, despite the administration of fluid challenge therapy patient's blood pressure was low and hence patient was started on inotropic infusion. Spo2 was 96 percent on room air.

ECG done on admission had ST Elevation in lead II, III, aVF and ST segment depression (not elevation) in the septal and anterior precordial leads (V1-V4) Suggestive of posterior wall involvement and hence posterior lead ECG was taken confirming posterior MI in lead V7-V9 (Figure 1, 2, 3). Cardiac markers were sent CKMB- 775, Trop I- 53000 were elevated, patient was administered loading dose of dual antiplatelets and statins and thrombolysis with injection streptokinase was done. Keeping in view of the pandemic a RTPCR for COVID-19 was sent which turned out to be positive for COVID-19. HRCT Chest was done which was suggestive of Bilateral Lower Lobe infiltration with CT severity score of 14/25 and CORAD 6 (Figure 4).

Coronary angiography was planned which suggested 90% lesion in the distal LCx with and hence angioplasty was done and a sirolimus eluting coronary system was deployed at the site of thrombus, just distal to the bifurcation (Figure 5). The procedure was uneventful and the patient was gradually stabilised. In view of COVID-19 positive status patient was started on remdesavir, antibiotics and other supportive measures. Patient was discharged on dual antiplatelets, statin, beta blocker, ACE inhibitor and other supportive management and is doing well on follow up.



**Figure 1** The standard 12 lead ECG representing the posterior- inferior wall changes

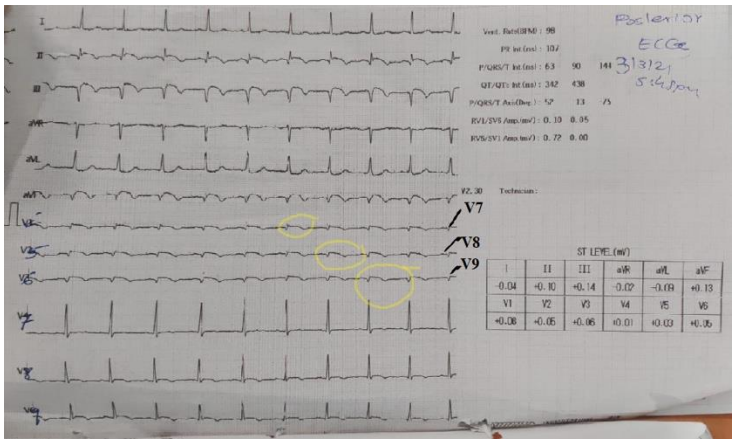


Figure 2 Posterior Lead ECG representing ST Elevation in lead V7-V8-V9

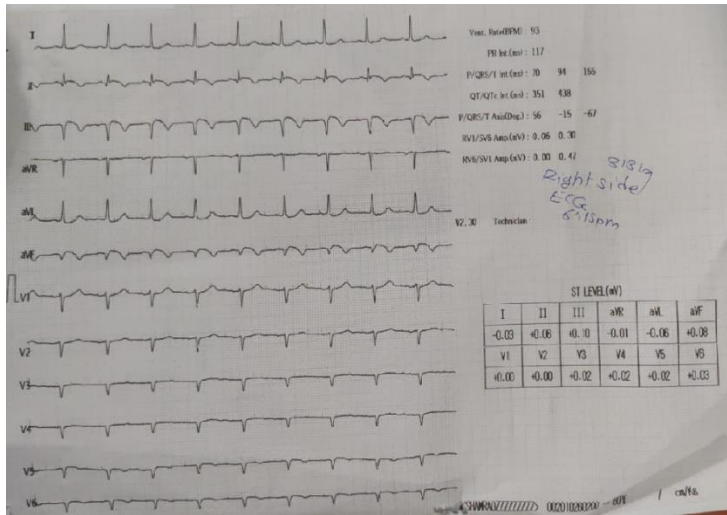
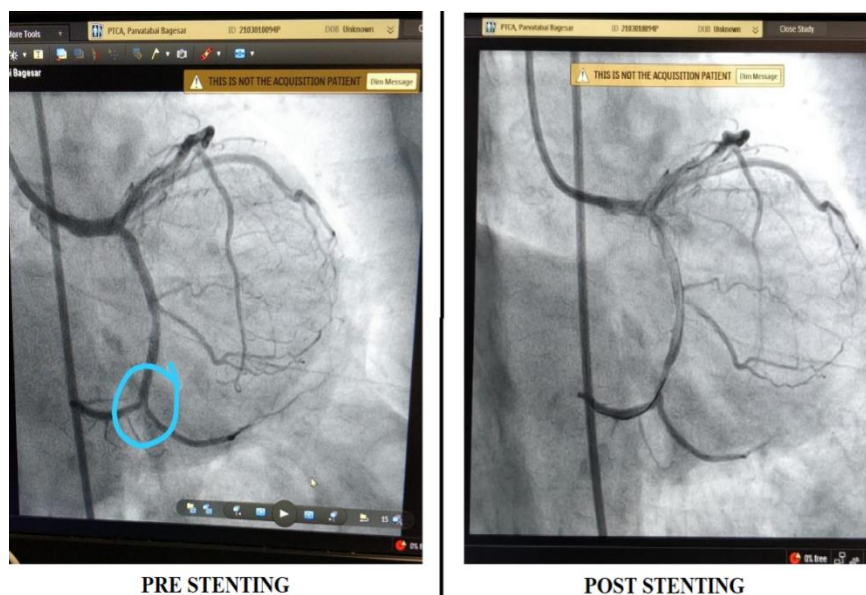


Figure 3 The right ventricular ECG



Figure 4 HRCT showing ground glass opacity



**Figure 5** The pre and post coronary angioplasty procedure suggestive of occlusion in the LCx (Left circumflex artery)

### 3. DISCUSSION

There have been multiple reports of COVID-19 induced thromboembolic episodes. Abnormal coagulation parameters account for coagulopathy in COVID-19 patients (Ueki et al., 2020). Profound local and systemic inflammation along with the Cytokine Storm of COVID-19 can account for the hypercoagulable state in COVID-19. This is leading to increased mortality in patients even without prior risk factors for thromboembolic events (Engelen et al., 1999). Also, the presence of ACE2 receptors on the endothelium of Coronary Vessels which might result into endothelitis during COVID-19 further precipitating the Hypercoagulable state of COVID-19 (Stefanini et al., 2020). The endothelitis induced by SARS-Cov2 may have caused the Thrombus formation or caused emboli which might have resulted in Myocardial Infarction in our patient. It is interesting to note that the patient in our case was a young female which is an unusual age group for myocardial infarction to present in COVID-19. In the absence of risk factors for Coronary Artery Disease such as Hypertension, Diabetes Mellitus or Dyslipidaemia COVID-19 emerges as a plausible cause for Myocardial Infarction in our patient. Given the increase incidence of stroke and myocardial infarction in COVID-19 there should be increased stress laid on thrombo prophylaxis of COVID-19 patients (Wanjari et al., 2020).

On the basis of the anatomy of coronary arteries and the location of blood vessels, posterior myocardial infarction is usually associated with inferior and/or lateral wall infarction, resulting in a large infarction area with a soaring danger of various factors such as left ventricular dysfunction, right ventricular infarction, ischemic mitral regurgitation, arrhythmias and fatal outcome. Hence, early diagnosis and management of posterior wall myocardial infarction is very crucial for the better prognosis of the patient.

### 4. CONCLUSION

We have reported a complicated case of Posterior Wall Myocardial Infarction caused by COVID-19 infection. Posterior Wall Myocardial Infarction in itself is a diagnostic challenge and our case was further complicated due to COVID-19 being its'etiology. Currently, the most often misdiagnosed myocardial infarction in the standard 12 lead electrocardiogram is the Posterior wall transmural myocardial infarction interpretation. Hence, the posterior wall leads (V7-V9) and the right ventricular lead ECG should be recommended routinely, especially in myocardial infarction of the inferior and/or lateral wall as this will help in early diagnosis and management. The use of these leads increases the number of diagnosed myocardial infarction, leading to better risk assessment, prognosis and survival, due to reperfusion therapy. Also, keeping the ongoing pandemic in mind, routine screening for COVID-19 in patients presenting with myocardial infarction should be done.

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We thank all the participants who have contributed in this Study.

**Conflict of interest**

The Authors have no conflicts of interest that are directly relevant to the content of this clinic-pathological case

**Financial Resources**

There are no financial resources to fund this study.

**Informed Consent**

Informed Consent was obtained from the patient.

**Author's Contribution**

All the authors contributed equally to the case report.

**Data and materials availability**

All data associated with this study are present in the paper.

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